TYPICAL SECTIONAL VIEW
PIPELINE AND FOUNTAIN

NOT TO SCALE

Labels:
- ELEVATION OF RELIABLE WATER LINE IN POND OR ELEVATION OF WATER IN SPRING BOX STA 0+00
- PIPE TO WATER SOURCE
- CUT OFF VALVE
- MAIN
- EXISTING GROUND
- 18" MIN PLACEMENT DEPTH
- PIPE (SEE LENGTH & TYPE BELOW) (MIN. 1¼ INCH)
- TEE @ STA ON MAIN = STA 0+00 OF SPUR IF DESIGN IS FOR SPUR OR CONTINUE MAIN
- MAIN OR SPUR
- PRESSURE REDUCER IF > 50 PSI
- 10'
- MIN. 6"
- STA OF FOUNTAIN
- 15" DIA x 3' POLYETHELENE HEATING TUBE
- 4" - 3000 PSI CONCRETE
- NON-WOVEN GEOTEXTILE
- ELEVATION OF FOUNTAIN
- FOUNTAIN WITH LOW PRESSURE ORIFICE
- HEAVY USE AREA (CODE 561)
- 8" (DGA, #8, #57, OR #610)

PLAN VIEW OF SYSTEM LAYOUT
(INCLUDE FOUNTAIN AND LINE NUMBERS)

NOT TO SCALE

ENGINEERING JOB CLASS _____

	MAIN #1	SPUR #2	SPUR #3	SPUR #4
TEE @ STA ON MAIN	XX			
FOUNTAIN STA				
FOUNTAIN TYPE				
FOUNTAIN ELEV				
PRESSURE REDUCER Y OR N				
PIPE LENGTH				
PIPE DIAMETER (MIN. 1¼")				

NOTES:
1. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL UTILITIES.
2. THE TRENCH SHALL BE FREE OF ROCKS AND OTHER SHARP EDGED MATERIALS.
3. THE PIPE SHALL BE PLACED IN A "SNAKE LIKE" POSITION IN THE TRENCH.
4. TURN ON THE WATER AND CHECK FOR LEAKS PRIOR TO BACKFILLING THE TRENCH.

BILL OF MATERIALS

QUANTITIES	UNIT	ITEM
	EACH	_____ BALL FOUNTAIN
	EACH	_____ BALL FOUNTAIN
	LIN. FEET	_____ PIPE
	LIN. FEET	_____ " PIPE
	LIN. FEET	_____ " PIPE
	EACH	_____ " ELBOWS
	EACH	_____ " ELBOWS
	EACH	_____ " ELBOWS
	EACH	PRESSURE REDUCER
70 (PER FOUNTAIN)	SQ. YDS.	NON WOVEN GEOTEXTILE
20 (PER FOUNTAIN)	TONS	ROCK (DGA, #8, #57, #610)
1	EACH	PIPE CLEANER
1	EACH	GLUE
(PER FOUNTAIN)	EACH	CUT OFF VALVES
(PER FOUNTAIN)	CU. YDS.	3000 PSI CONCRETE
3 (PER FOUNTAIN)	FEET	15" POLYETHELENE TUBE

PIPELINE AND FOUNTAIN
(PRACTICE CODE 516 AND 614)

GRAVITY PIPELINE AND FOUNTAIN DESIGN

	Main #1	Spur #2	Spur #3	Spur #4
1) Pipe and Fountain				
2) Type and Number of Animals				
3) Fountain Description				
4) Elevation of the Waterline				
5) Elevation of the Fountain				
6) Total Available Head (ft.) (min.4 ft., if> 115 add pressure reducer)	=			
7) Length of Pipe Along Ground Line (ft.) (for design purposes this distance is from the meter, down the main, and out the spur)				
8) Flow Rate in Pipe (see below) (g/h)				
9) Length of Pipe to Install (ft.)				
10) PVC Pipe Diameter (in.)				

FLOW RATE IN PIPE

Fountain with little or no storage...............900 gallons per hour
6 ball fountain..720 gallons per hour
2 or 4 ball fountain.......................................510 gallons per hour

PIPELINE DESIGN CHART FOR LIVESTOCK WATER FACILITIES
(plot lines on this chart, see KYFOTG IV for instructions)

AVAILABLE HEAD-FEET

LENGTH OF PIPELINE-FEET

PIVOT LINE

PVC PIPELINE SIZE

FLOW-GALLONS PER HOUR

Design note: The main shall be designed from the meter to the farthest fountain in the system. The spurs may be a smaller size than the main.
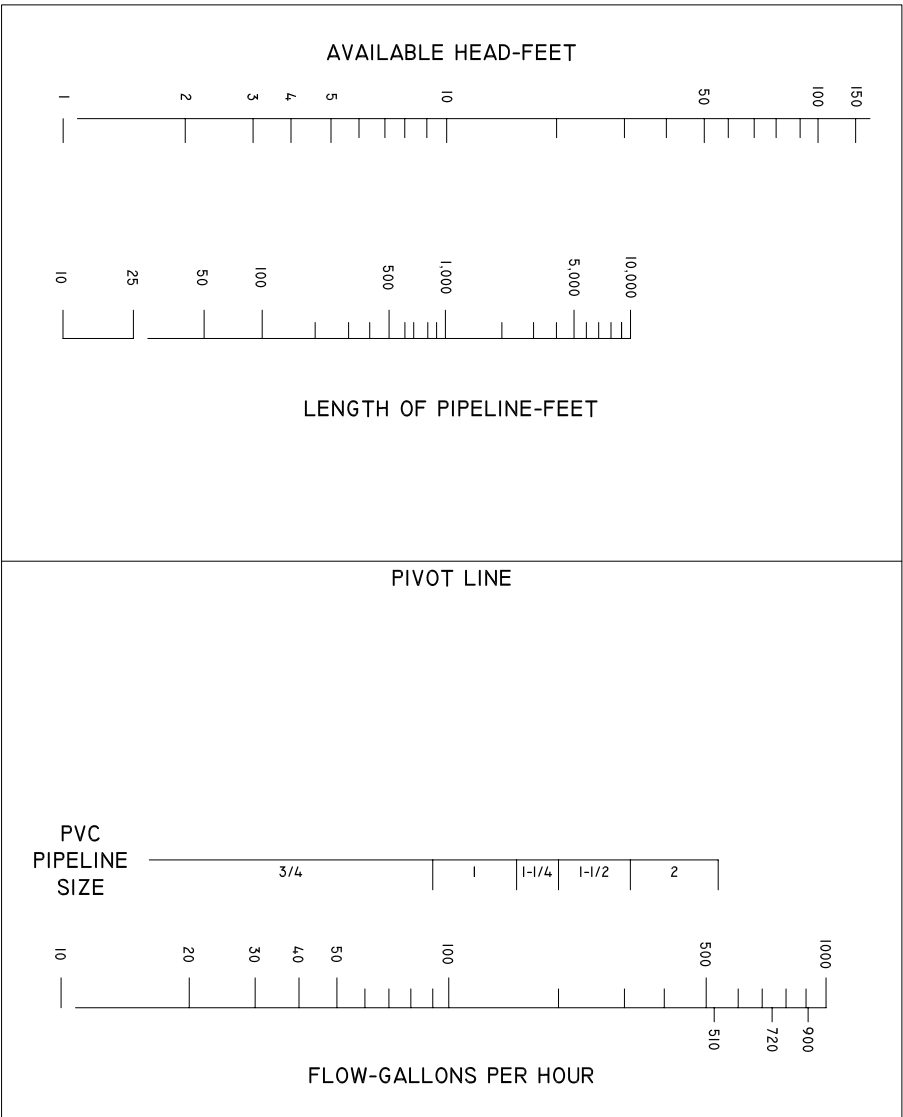
DESIGN PROCEDURE

1) The design survey shall have the elevation of the reliable water line in the pond or the spring development and the elevation of each watering facility to be installed. A GPS is not accurate enough for this and it cannot be taken from a topographic map. You will also need to tape along the ground line of the proposed pipeline to determine how much pipe to design for. This can be done with a GPS with a backpack antenna. If you use a GPS, be sure to get shots close enough together to depict the ground line not the horizontal distance. Note in the taped survey or GPS survey where the spurs will be coming off the main line. The main line will usually be the one to the watering facility that is the farthest distance from the source. However, due to more head loss in one of the spur lines, the spur with a shorter distance may actually require a larger pipe. In this case, the larger pipe would be used for the spur and from the spur out the main to the source. Be sure to draw a plan view of the layout to accompany your survey.

2) Determine from the landowner which brand and type of watering facility he plans to use at each location. (i.e. MiraFount 4 ball) Make sure the particular brand and type will service the number of animals the landowner plans to have in the field at one time. If you are installing multiple fountains off one main, and cattle will be using more than one fountain at a time, just use the flow in the pipeline for one fountain. Do not multiply the flow required for a fountain by the numbers of fountains used at one time.

3) Begin by designing the main. Fill in the blanks of the Pipeline and Fountain Design chart. For the main, the length of pipe along the ground line and the length of pipe to install will be the same. Using the total available head (line 6), length of pipe along the ground (line 7), and flow rate in pipe (line 8), determine the pipe size of the main.

4) To design the size of a spur line, use the same process except the length along the ground line (line 7) will be the length of the spur plus the length from the source to the spur. The length of pipe to install (line 9) will be the length of the spur. The diameter of the spur line should be smaller or equal to the size of the main. If not, adjust the size of the main out to the source as described in 1) above. Continue this process until all of the spurs have been designed.

5) It is best to tee off a short distance to install a fountain that is on the main line so that if necessary a pressure reducer can be installed on the spur rather than on the main line. The pipes can withstand most pressures we encounter and you may need the pressure on down the line. The fountains are what is sensitive to pressure.

6) Schedule 40 PVC pipe is most commonly used for these facilities. But in the event that another type of pipe (that meets the standards) is to be used, list the length and type pipe material used in the Bill of Materials on the drawing.

7) Any time the gained head produces a total available head (line 6) greater than 115 feet (50 psi), a pressure reducer should be installed at the watering facility.

8) The engineering job class will be based on the pressure, which is total available head divided by 2.31, and the length of pipe to the farthest watering facility (usually the main). Do not use the total length of the spurs too. Give a copy of the *front sheet only* to the landowner or contractor.

CONSTRUCTION CHECK

	Main #1	Spur #2	Spur #3	Spur #4
Length of Pipe (ft.)(measured)				
Diameter of Pipe (in.)				
Description of Pipe				
Min. Cover				
	#1	#2	#3	#4
Description of Fountain				
Elev. of Fountain				
Min. Projection of HUA				

To the best of my professional knowledge, judgment, and belief the installed practice meets NRCS standards.

Name _____ Title _____ Date _____

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(back)
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